

CORNELL EXTENSION BULLETIN 1042

NEW YORK STATE COLLEGE OF AGRICULTURE

GROWING CABBAGE IN NEW YORK

BY EDWIN B. OYER





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Cabbage can be grown successfully anywhere in New York, but the most important areas of production are the Erie-Ontario Plain and Long Island. About 800 acres of early domestic cabbage are produced on Long Island each year. Domestic varieties are also planted at a later date upstate where about 5,000 acres are harvested annually for market and for the production of sauerkraut. New York produces more cabbage for sauerkraut than any other state and an additional 10,000 acres of Danish cabbage is produced for late fall market and winter storage. Domestic varieties grown by market gardeners around the large cities are generally sold at local markets, but the large crop of Danish cabbage is shipped directly from field and storage to many large cities in eastern United States. Although the production of cabbage is more costly than that of field crops, it is a relatively inexpensive crop to grow compared to some other vegetables.

Climate and Soils for Best Production

Because cabbage is a cool season crop, it adapts well to New York State climate and may be grown whenever temperatures are high enough to promote growth. Growth is very slow when mean temperatures are as low as 50° F. Transplanting begins in late March or early April in some areas and harvesting continues until mid-November. Both young, hardened seedlings and mature heads can withstand freezing temperatures as low as 20° F. if the duration of the cold period is not too long. In general, however, it is best to avoid extremely early plantings or late harvests because young plants may bolt or form seedstalks when subjected to prolonged periods of cool weather. The quality of mature heads declines rapidly after repeated heavy freezes.

Cabbage is a biennial plant, which means that two years are required for the completion of its life cycle. Under normal conditions, seeds planted in the spring will produce only leaves (heads) during the first year. The plant then goes through the winter, or a cold period, and produces flowers and seeds during the following warm season. When the plant flowers, a long stem or seedstalk is produced. The development of this seedstalk is called bolting.

Occasionally cabbage plants produce seedstalks and flowers instead of saleable heads during their first growing season. The development of seedstalks

instead of salable heads occurs when large plants, those with stem diameters of about one-fourth inch or larger, are exposed to two to three weeks of temperatures averaging 40° F. or lower. Longer periods of exposure to temperatures below 60° F. also may result in bolting. Because smaller plants are less sensitive to cold, the grower may set small plants early and still be relatively safe from problems of bolting. In general, bolting is seldom serious in New York but growers should be aware of the conditions that cause it.

The best soil for cabbage production depends on the market for which the crop is being grown. For early fresh market production, the best soil is light, sandy, and early-warming. High yields of late cabbage are produced on well-drained loam soils. Cabbage is a moderately deep rooted crop; therefore a relatively deep, well-drained soil is preferred. Irrigation is essential for top yields whenever precipitation or available soil moisture is deficient.

Areas of Production in New York

Early market cabbage is produced primarily on Long Island and in market garden areas around Albany, Syracuse, Rochester and Buffalo where there are some sandy well-drained soils. Most of these areas receive some frost protection because of their nearness to water.

Ontario and adjoining counties in north central New York produce most of the cabbage that is sold to sauerkraut processors. The principal area of Danish cabbage production for storage and market is the Erie-Ontario Plain in north-western New York, although significant quantities grow in other areas such as the capital district, lower Hudson Valley and Cortland County.

Cabbage is a common vegetable in home gardens. By proper selection of varieties and planting dates, a fresh supply of cabbage may be available from July through October.

Soil Management for Cabbage Production

Because of disease factors, cabbage should not be grown on the same soil more than once in four years. Therefore cabbage is grown in a rotation including other vegetables or agronomic crops. The particular place for cabbage in a rotation depends upon the season in which it is to be marketed.

The organic matter of the soil should be maintained by use of cover or green manure crops in areas where animal manure is scarce. Rye or ryegrass seem to work best in a vegetable production program. Ryegrass should be planted in late summer or early fall between the rows of growing cabbage plants after the last cultivation. Rye is planted immediately after the crop is harvested, but will probably not make much fall growth unless planted sometime in early October.

Plowing should be done in the spring before the cover crop makes too much growth to turn under well, and when the soil moisture is at an optimal level for plowing. It is advisable to plow down nitrogen with the green manure crop at the rate of 40 to 60 pounds of actual nitrogen per acre.

Because the cabbage crop is usually transplanted, only a moderate amount of tillage is necessary before planting. If plowing is done in the spring and the crop is not transplanted until July, work the ground only enough to control weeds. Excessive tillage breaks down the structure of the soil and diminishes the pore space for penetration of water and air.

Types and Varieties

There are several groups of cabbage and many varieties within each group. Perhaps the most practical method of classifying the varieties of cabbage is according to their use and the season in which they mature.

There are two main groups of cabbage grown in New York, domestic and Danish. Although there is no strict botanical distinction between these two groups, the domestic varieties usually mature earlier, are more tender in texture, and have less wax or bloom on their leaves than the Danish varieties. Domestic varieties are used primarily for early and midseason marketing and for sauerkraut. Domestic cabbage can be further subdivided by season of maturity and the shape of the head, which may vary from round to flat. Most varieties grown in New York are round but some rather flat heading varieties are used for sauerkraut.

Danish varieties usually mature later with blue-green foliage resulting from the heavy bloom on their leaves. They are considered to be tougher because they have more fiber than the domestic varieties. These varieties are used primarily for shipping and winter storage. Danish varieties usually are round to slightly flat in shape. Breeders are working to develop earlier varieties of Danish cabbage.

An important factor to be considered in selecting a variety of cabbage to grow is its resistance to the soil borne fungus disease, *Fusarium* yellows, more commonly called yellows. Many soils in New York are infested with this fungus and only yellows-resistant varieties should be grown. Fortunately, there are yellows-resistant varieties available in all groups of cabbage.

Varieties for New York

Domestic

The table on the following page shows the domestic varieties commonly grown in New York:

Table 1. Domestic Cabbage Varieties: Their Properties and Use

Variety	Season of Maturity	Common Uses	Resistance to Yellows
Golden Acre	First early	Market	Susceptible*
Copenhagen Market	Early	Market	Susceptible*
Badger Market	Early	Market	Resistant
Round Dutch	Mid-Season	Market and shipping	Susceptible
Greenback	Mid-Season	Market and shipping	Resistant
Marion Market	Mid-Season	Market, shipping and kraut	Resistant
Early Kraut	Mid-Season	Sauerkraut	Resistant
Globe	Late	Sauerkraut	Resistant
Wisconsin All Season	Late	Sauerkraut	Resistant
Improved Glory	Late	Sauerkraut	Susceptible*

*Resistant strains are available.

Danish

There are many strains of Danish Ballhead available from seedsmen. In general, the cabbages mature in approximately 100 days and are used primarily for market and storage, although some processors prefer Danish types for the production of sauerkraut. There are a number of available varieties that are yellows-resistant.

Golden Acre and Copenhagen Market varieties are susceptible to bolting but Round Dutch and Greenback are resistant. All varieties of cabbage suggested for sauerkraut are yellows-resistant except Improved Glory. The resistant varieties do not yield as well as Improved Glory if yellows is not present, but they are preferred if the soil is infested. Plant breeders are developing an Improved Glory with resistance to yellows.

Other Types and Varieties

Red cabbage is available in varieties that mature in all seasons. Red Acre is a good early variety and Red Danish a late variety. Although some savoy cabbage is grown, the market is limited. Chieftain and Vanguard are good varieties of this type.

Currently, there are several varieties of hybrid cabbage on the market. The major distinction of the hybrids is their uniformity of head size and maturity. This latter factor may actually serve as a disadvantage in the home garden where fresh heads are desirable over a long period of time. Commercial growers, however, should be alert to the advantages in growing a uniform maturing variety because much labor may be saved by the shorter cutting period.

Seeding and Plant Growing

Early market cabbage plants are usually started in greenhouses. Seed is sown about six or eight weeks before plants are to be set into the field. The seeds are sown thickly in rows in flats or benches. Seedlings are transplanted to flats at a spacing of two inches by two inches soon after the cotyledons have expanded fully and the first true leaf is beginning to emerge. This is the only transplanting recommended until field setting. Many growers feel that transplanting is beneficial and produces stocky plants. Experiments have shown that transplanting is not beneficial but is sometimes a necessary evil. The common statement that cabbage has to be transplanted to form a head is likewise unfounded. It has been shown that transplanting is more harmful as plants grow older. Some growers prefer to avoid one transplanting by seeding directly into ground beds in the greenhouse and thinning to 12 to 18 plants per foot. This method saves labor in transplanting.

Temperatures in the greenhouse should be maintained between 60° F. and 70° F. Before field setting, the plants should be hardened for five days to a week by lowering the temperature to about 50° F. and withholding water. Because a prolonged period of hardening at low temperature may cause bolting, any additional hardening should be done by withholding water while the plants are held at warmer temperatures. Hardened plants are better able to withstand cold weather and drying winds after they are in the field.

Plants to be set into the field during the summer for the late crops are started in field seedbeds about five to seven weeks before field setting. The location of the seedbed should be selected with great care. A loose soil high in organic matter is preferred because it does not crust and water penetrates freely. The site should be near a source of water for irrigation and one on which plants of the cabbage family (including weeds) have not been grown for six or seven years. This precaution is necessary to avoid clubroot for diseased transplants will infect clean fields.

To fertilize the seedbed, apply from 300 to 600 pounds per acre of an 8-16-16 fertilizer or its equivalent after the area has been plowed, and before discing. This would be 7 to 14 pounds per 1,000 square feet. This amount of nutrients is usually adequate for the short period of growth in the seedbed unless rows are very close together or seeds are broadcast at a heavy rate.

This cabbage planted in western New York was kept essentially weed free by the proper use of Vegadex.





Plants are being set one foot apart in rows two feet apart. The third man is filling in skips. This high population results in a reduced head size of about three pounds. This grower will irrigate these newly set plants at the end of the day.

Seeds are sown in the field seedbed in rows 12 to 16 inches apart, with 20 to 30 seeds planted per foot of row. In order to estimate seed requirements the following figures are suggested as a guide. In field seedbeds, a pound of seed should produce at least 30,000 plants on about 4,000 square feet of bed. Under ideal conditions such as a plantbed on muck soil, the number of plants obtained per pound of seed may be more than doubled.

Field seedbeds may be kept essentially weed free during the period of plant growing by the correct use of the herbicide Vegadex at the rate of four to five pounds per acre. This material kills germinating weed seeds but cabbage seeds tolerate the chemical. To be most effective, it is essential that the chemical be applied to freshly worked soil and followed with one-half to one inch of irrigation or rainfall within two days. This means that the seedbed should be fitted, seeded, treated with Vegadex, and irrigated within two days. The water stimulates the germination of both the weed and crop seeds and moves the chemical down to the vicinity of the germinating weed seeds. This combination of events practically insures a plantbed free of annual weeds. *Caution:* Vegadex will kill or seriously reduce stands of seeded cabbage in hot weather. Do not apply if mid-day temperatures in the shade are likely to be 80° F. or higher for several days after treating.

Transplanting

Cultural practices used in transplanting are determined to some extent by conditions at transplanting time and the market to which the crop will be sold. For example, when conditions are favorable for the establishment of transplants, *i.e.* cool, cloudy days when the soil is moist and air movement is slight, smaller plants (6 to 8 leaves) will probably resume growth faster and produce larger yields than larger plants (8 to 12 leaves). The larger plants will survive longer periods of hot, dry weather after transplanting because they contain greater amounts of reserve food materials needed for root replacement. Larger plants

should be favored over smaller ones for summer transplanting if irrigation is not available. It is advisable to follow transplanting with irrigation to provide water for the plant and to help firm the soil around the roots. Plants grown in flats in the greenhouse are often transplanted with a ball of soil adhering to their roots. Plants pulled from field seedbeds have little soil on the roots.

Be sure to select uniformly-sized, disease-free transplants for field setting. Non-uniform plants cause greater variations in head size. When setting plants in the field, use water and starter solution whenever possible.

Starter solution is made by dissolving a complete starter fertilizer in water and applying from one-third to one-half pint of this solution to each plant. This provides a ready supply of nutrients and some water to the injured root system of the transplants. Where fertilizers have been broadcast and transplanting is followed immediately by irrigation, the use of starter solutions may not be beneficial. Numerous brands of soluble starter fertilizers are available, and the manufacturer's directions for rate of application should be followed.

Spacing of the transplants in the field is determined by the variety and the market for which the crop is grown. Early varieties are usually spaced from 10 to 12 inches apart in rows from two to three feet apart. Cabbage for kraut, for which large heads are desirable, is spaced 18 inches apart in rows that are three feet apart. For the late Danish crop, the demand is for small heads weighing about three pounds each. This size head may be obtained by close spacing. For some varieties, a spacing of one foot between plants in rows three feet apart is sufficiently close to obtain this size; for other varieties it is necessary to close the rows from three to two feet apart. It is not advisable to space plants of Danish types closer than one foot apart in the row.

If it is necessary to store plants for several days after they have been lifted from the seedbed and before they can be set in the field, it is much better to heel them into soil in a shaded spot than to store them in a cool, dark basement. If plants are kept packed together tightly they may heat and use up their reserve food supply while stored in the dark. By heeling the plants into moist soil in small bunches, overheating is avoided and plants are exposed to light, which is necessary to replenish their food supply.

The need of closer spacing to reduce head size, and the availability of a good selective herbicide for cabbage has made the direct seeding of cabbage practical.

These heads of Empire Danish cabbage were grown at the spacings between plants and between rows listed under each head. For example 16 x 36 means plants were 16 inches apart in rows 36 inches apart.



This means that cabbage is seeded directly in the field and excess plants are hoed out when they are about two inches high, leaving single plants at the desired spacing in the row.

Excellent weed control can also be obtained by using Vegadex after transplanting or thinning. Destroy weed seedlings by a clean cultivation before applying Vegadex and follow the treatment with irrigation.

Liming, Fertilizing and Cultivation

Lime is applied to raise the pH of the soil. Cabbage grows best on slightly acid soils maintained at a pH of 6.0 to 6.8. If soils on which cabbage is to be grown are extremely acid (low pH) and large amounts of lime will be needed to attain the desired pH, one-half of the necessary amount should be added before plowing, and the remainder worked into the soil after plowing.

Unless clubroot is present and hydrated lime is prescribed by local county agents, the use of finely ground limestone is more economical and satisfactory for adjusting acidity. If the area is low in magnesium, dolomitic limestone should be used. After the desired pH is attained, small periodic additions of lime will maintain this pH at low cost. A regular soil testing program will be helpful in determining lime and fertilizer needs.

Cabbage and related crops in general have high requirement for nitrogen, potassium and magnesium. Nitrogen, potassium and phosphorus are supplied in the complete fertilizer, and magnesium is seldom limiting if pH levels are maintained in the desired range of 6.0 to 6.8.

The general fertilizer recommendation for cabbage grown on sandy soils is 1,000 to 1,200 pounds of an 8-16-16 fertilizer or its equivalent applied and disced in after plowing. On loam soils, 800 to 1,000 pounds per acre of a 10-20-10 fertilizer or its equivalent are recommended. One-half of the fertilizer should be broadcast before plowing and the second half applied in bands four inches deep and four inches from the row at the time of planting.

If banding equipment is not available, all of the fertilizer may be applied after plowing and before disking. On Long Island, 1,000 pounds of a 10-20-10 or equivalent is used with 20 pounds of borax and 50 pounds of magnesium oxide on an acre, all applied after plowing and before disking.

The correct placement of phosphorus and potassium in the soil is extremely important. Phosphorous does not move from its place of application in the soil and potassium (potash) moves very little except in sandy soils heavily leached with rain. For this reason, it is important to get these nutrient elements as deep in the soil as possible so they will be available to a greater portion of the plant's root system. The applications made before plowing are turned under with the top of the soil. If the fertilizer is applied after plowing, it should be done

before disking because some of the fertilizer will fall to the lower portion of the plowed layer during the disking operation.

Banding provides an efficient means of applying fertilizer and a lower proportion of the phosphorous is fixed by the soil. It is important that the bands are placed deep in the soil where the extending roots will reach the fertilizer. Sidedressings of complete fertilizer are seldom beneficial and nitrogen is the only nutrient applied in this manner.

More phosphorous and potassium may be added to vegetable soils over the years than plants utilize, and the levels of these available nutrients may increase to the point where a reduction in the amount of fertilizer applied may be practical. The level of these nutrients in soil can be estimated by soil tests. If soil tests show high levels of these nutrients are available, a saving may be made by reducing the amount of fertilizer applied. Consult your local county agricultural agent for information on soil tests and their interpretations.

Nitrogen is the element that is most likely to limit cabbage production. This probably results from the high nitrogen requirements of cabbage and to the fact that nitrate nitrogen is readily leached from the root zone by drainage water. Nitrogen is present in organic matter in the soil. A part of this nitrogen is made available to the plants during the season by the action of bacteria in the soil. The amount of nitrogen released in this way is not enough to satisfy the needs of the cabbage crop, however, so additional amounts are added in the fertilizer at or before planting time.

The nitrogen added in the fertilizer may be of one or both of two forms; ammonium or nitrate. The ammonium form is retained on clay particles in the soil, rendering it available to the plants over a long period of time. It is also available to bacteria that convert it to the nitrate form. The nitrate form is not retained on the clay particles of the soil and is readily leached from the soil by excessive rains or irrigations. Both forms of nitrogen are taken up by plant roots but in general the nitrate form is preferred.

Because most forms of nitrogen are ultimately converted to the leachable nitrate form, it is often necessary to apply nitrogen as a sidedressing to the crop during the growing season.

Sidedressing with Nitrogen

Nitrogen sidedressings should be applied according to the rainfall during the season. If the season is very wet, two or three applications of 25 to 30 pounds of nitrogen may be necessary, especially on sandy soils. In a dry season, if irrigation is not available, only one or even no sidedressing may be necessary. There are many forms of nitrogen materials available. Some of the more common sources of nitrogen used in New York are listed in table 2 on the following page.

Table 2. Sources of Nitrogen

Material	Form of nitrogen	Percent of nitrogen	Pounds of material to provide 30 pounds nitrogen
Urea	Ammonium	45	67
Ammonium nitrate	Both	33	91
Ammonium sulfate	Ammonium	20	150
Nitrate of soda	Nitrate	16	187

A number of nitrogen solutions are available on the market at competitive prices and are equal in quality to dry materials.

Cultivation

The main purposes of cultivation are to control weeds and break the crust of surface soil after a rain. This practice promotes better penetration of water during the next rain or irrigation. The number of cultivations needed is determined largely by the number of rains and the resultant stand of weeds. If there is little rain and therefore very few weeds, it is not necessary to cultivate. When soil is cultivated after a rain to break the crust and destroy weeds, any additional cultivation will be costly and may harm roots near the surface.

Shallow cultivation is preferable to deep cultivation after plants are well established. Some farmers feel that cultivation brings moisture to the surface and therefore promotes better soil moisture conditions for the plants. Moisture brought to the surface by cultivation soon evaporates, however, and is lost to the plant when it may have been useful if left deeper in the soil.

Irrigation

Irrigating to make a crop, not to save it, has become a standard cultural practice with good growers. A shortage of water exists at sometime during nearly every growing season. Water shortage means reduced yields and consequently reduced profits.

To be most effective, irrigations should be timely. One very important time for irrigation is immediately after setting plants in the field. This application of water not only provides a source of moisture for the de-rooted transplant, but helps settle the soil around the plant roots so they are directly in contact with a source of moisture. For highest yields there should be additional irrigations when the soil begins to appear dry on the surface.

To be used most effectively, the water applied during an irrigation must enter the soil. Often the rate of application of water is too great and water stands in the furrow between rows. Soils vary in the rate at which they can absorb water as well as in their water holding capacity. Soil properties should be considered in designing and using the irrigation system.

Table 3. Variety, Transplanting and Harvest Dates for Good Yields

Variety and Season	Transplanting Period	Harvest Period	Good Yield Tons per Acre
Golden Acre 1st Early	April	June 20-July 15	15
Copenhagen Types Early	April	July	15
Round Dutch Types Mid-season	May	July 15-Aug. 15	15
Danish for market Late	June 15-June 30	Sept. 15-Oct. 30	20
Danish for storage Late	July 1-July 15	Oct. 20-Nov. 15	20
Glory for kraut	June 15-June 30	October	30

Planting and Harvest Dates

The number of days from transplanting to harvesting, and the yields expected, will depend on variety, spacing, and growing conditions. The data on the above table may serve as a guide. While the yields noted here are well above the state average yields, they are not excessively high. Many growers frequently obtain yields even higher than these.

Important Diseases and Insects¹

The first step in preventing cabbage diseases is to buy seed that has been hot water treated for the control of seed-borne diseases. It is also important to avoid clubroot infested soils and to use yellows-resistant varieties where these soil-borne diseases exist. Careful soil selection is doubly important when locating the seedbed. Wirestem or damping-off is another disease commonly found in seedbeds. Treatments for its prevention and for the prevention of cutworms, and especially maggots, is a must for healthy plants.

Flea beetles may cause severe damage to small cabbage seedlings in a very short time and should be checked. As soon as cabbage plants attain some size they attract butterflies and moths that lay eggs on the leaves which develop into cabbage worms and cabbage loopers. These insects are probably the worst pests of cabbage and recommended control measures should be followed carefully. Plant lice or aphids are often a serious pest in hot weather. As well as injuring the plant by their feeding, they may infect the plant with a virus that is especially serious where cabbage is being stored. The virus causes black specks on the leaves, even those near the center of the head.

¹This is a general discussion of these topics. For details of cabbage diseases and insects and their control, consult Cornell Extension Bulletin 1034, *Vegetable Diseases*; Cornell Extension Bulletin 1035, *Common Insects of Vegetables*, and the annual *Vegetable Production Recommendations*.

Physiological Disorders

Physiological disorders are uncommon when recommended practices are followed. The disorders most commonly observed on cabbage in New York are magnesium, potassium, and boron deficiency, and injury from 2,4-D. Another physiological disorder, bolting, was discussed in an earlier section of this publication.

Magnesium deficiency is characterized by a yellowing between the veins of the older leaves. The pattern is not unlike a mosaic symptom. This deficiency usually occurs on acid soils. If the pH of the soil is maintained in the appropriate range (6.0 to 6.8), this disorder will not be a problem unless soils are naturally low in magnesium.

Potassium deficiency is another disorder that is fairly common because of the high potassium requirement of the crop. This deficiency is characterized by a yellowing on the margins of the older leaves, and is prevented by the application of sufficient potassium in the fertilizer. Both magnesium and potassium deficiencies may be prevented by periodic use of soil tests.

Boron deficiency is very seldom a problem on cabbage in New York, but occurs commonly on cauliflower. This deficiency usually does not become apparent until the heads are cut. The water-soaked spots that appear may be brown and associated with a splitting of the center of the stem or core. In severe cases, the upper surfaces of the mid-rib on the older leaves may be cross-hatched or checked. When this disorder is a problem, an application of 20 pounds of borax per acre will correct it.

It is not unusual for cabbage to be transplanted at a time when neighbors are spraying corn, or when roadsides are being treated with 2,4-D. Damage to cabbage may be caused by drifts of the spray solution or by the 2,4-D vapors if volatile esters are used. While the roots are usually damaged first, growers



This is 2,4-D injury on cabbage plants. To avoid such damage, growers must protect plants from contamination from other spray materials, drift of applications from nearby fields, and residual effects in the soil.

commonly notice a curling and twisting of leaves and stems as the first indication of injury. In severe cases, callus tissue forms around the tap root as shown on page 13.

Barrels or tubs contaminated with 2,4-D have been used to contain solutions of insecticide or starter solution in which plants are dipped before setting. This results in severe damage to the cabbage. The 2,4-D can be absorbed by either the roots or the foliage. It is a poor practice to store containers of 2,4-D near insecticides and fungicides because of the ease of mistakes in using the proper material. Extreme caution is necessary in handling 2,4-D near vegetables, because a little contamination can do much to damage a crop.

Harvesting and Marketing

To avoid losses from splitting, harvest heads of cabbage when they are firm and at prime maturity. Immature heads will not be well filled and yields will be low. The surface of the head of most varieties will usually lose its glossy green appearance and turn to a grayish-green when the head matures. This change of appearance as well as the increase in firmness of the head are guides for harvesting. If plants are selected carefully and spaced uniformly in the field, the crop will mature uniformly and nearly all of the heads may be cut in one or, at most, two cuttings.

Most buyers of fresh market cabbage prefer heads with four or five wrapper leaves instead of a bald head. The wrapper leaves add to the appearance of the head and serve as a cushion against injury during shipment. On arrival at the retail level, injured wrapper leaves (perhaps two or three) may be removed leaving a leafy, attractive head for display.

The desire for leafy heads of cabbage has affected the shipping container used. Some growers are now finding it an advantage to ship cabbage in wooden or cardboard boxes stamped with their brand. This container gives heads a neater

An ideal market cabbage is a head weighing slightly over three pounds and well enveloped by healthy wrapper leaves. These leaves protect the head and add to its attractiveness.





This cabbage is to be stored in pallet boxes. The boxes are filled in the field, hauled on the wagon to the storage and stacked in storage until sold.

appearance in a firmer package and cabbages are less likely to be damaged during packaging, loading and hauling. Cabbage is usually sold in 50 pound units.

Careful handling is extremely important during harvesting, packaging and marketing. Cabbage leaves can be injured easily, making an entry for disease organisms. Furthermore, the appearance of the product is diminished by rough handling.

The most efficient method of harvesting will depend on the market for which the crop is grown. Many growers pack their cabbage in bushel baskets or boxes right in the field; others prefer hauling the heads from the field to a packing house. When cabbage is grown for sauerkraut, it is usually loaded directly onto trucks or wagons for hauling to the processor. Cabbage grown for storage is usually loaded directly on trucks or wagons, hauled to the storage houses and placed in bins by hand, or unloaded onto conveyor belts. From there, they are placed in the appropriate storage area.

With the development of uniform varieties, especially hybrids, the development of a mechanical cabbage harvester may become practical for some purposes. At present, growers in some areas are using conveyors as a mechanical aid to harvesting, and the crop is packed directly into boxes in the field. Labor saved by these methods compared to hand harvesting is reported at about one-half.

Another new development is the use of pallet boxes for storing cabbage. A pallet box is a large wooden crate into which cabbage is loaded in the field and hauled to the storage house where it is stacked by a fork-lift tractor or a manure loader on the farm tractor. This method saves much labor and provides small sized bins for the crop. Pallet boxes also can be used for harvesting cabbage to be hauled to a packing shed and for harvesting other vegetables.

In the preceding discussion, it has been assumed that the cabbage to be marketed will be graded carefully for uniformity and freedom from disease and insect injury. The grower who consistently markets high quality, graded, and attractively packaged merchandise will have satisfied customers and repeat orders. If a majority of the cabbage growers in New York would follow these practices, the reputation and demand for New York cabbage might improve greatly.

Storing Cabbage

Cabbage grown for storage is transplanted late in the season, usually between July 1 and 15, and is harvested in late October or early November. It is generally considered better to harvest storage cabbage slightly on the immature side while a bright green color persists. Since most storages are insulated common (unrefrigerated) storages, it is preferable that heads be cold when placed in storage and that the temperature of the storage be maintained near 32° F. if possible. It is often expedient to open the storage at night in the late fall to allow colder air to penetrate the storage pile, and to keep the storage closed on warm days. The use of fans to move cool outside air into the storage may also be beneficial, but too much air movement should be avoided to prevent excessive loss of moisture from the heads. A high relative humidity should be maintained if possible. If the cabbage is held through winter months, a source of heat may be necessary to prevent freezing.

Heads of cabbage kept in a dark place will eventually lose their green color, but the rate of color loss can be reduced by keeping the temperature low, and by storing disease-free heads. Cabbage harvested for storage is commonly trimmed closely before storage and retrimmed as necessary on removal from storage. After this much trimming the head is white. Observations indicate that growers who store heads that are relatively free from disease and insect injury and not closely trimmed, are able to market a more attractive product on removal from storage than growers who do not follow these practices.

Many types of storage buildings exist but the most common are those which are divided into bins about three to four feet wide and with about four-inch spaces between bins for air movement. Cabbage is also commonly stored in basements or on barn floors. If a large volume or pile of cabbage is to be stored, it is advisable to have A-frames running through the pile at appropriate distances (about 10 feet apart) to provide for some air movement and ventilation within the pile.

A publication of the
New York State College of Agriculture,
a unit of the State University,
at Cornell University
Ithaca, New York

JULY 1960



Cooperative Extension Service, New York State College of Agriculture at Cornell University and the U. S. Department of Agriculture cooperating. In furtherance of Acts of Congress May 8, June 30, 1914. M. C. Bond, Director of Extension, Ithaca, New York.

PS—6M

